## ATMOSPHERIC STRUCTURE FUNCTIONS

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A velocity structure function is a statistical moment of the difference, $\delta\mathbf{u} = \mathbf{u}' - \mathbf{u}$, between the velocities at two points separated by a variable distance $r$. Recently, Lindborg (1999, *J. Fluid Mech.*, **388**, 259-288) has evaluated atmospheric velocity structure functions, in the range $2km < r < 2500km$, using data from a about 6000 airplane flights reported in the MOZAIC data set. It was found that the second order the structure function can be written as

$$\langle \delta\mathbf{u} \cdot \delta\mathbf{u} \rangle = a\, r^{2/3} + b\, r^2 - c\, r^2 \log(r) \tag{1}$$

with corresponding energy spectrum $E(k) = 0.12a\, k^{-5/3} + 0.5c\, k^{-3}$.
This contribution is a continuation of the theoretical and experimental investigation presented by Lindborg (1999). Especially, the latitude dependence of the structure functions is studied. It is found that the two last terms in (**??**) are small at latitudes around the equator, while the first term has no clear latitude dependence. A simple equation is derived, which indicates that the last two terms in (**??**) are directly dependent on the presence of system rotation. It is found that the second order structure function near the equatior scales as $\sim r^{2/3+\mu}$, where $\mu$ is a small intermittency parameter. The results are discussed in the light of the gravity wave hypothesis, as well as the two-dimensional turbulence hypothesis. A renewed attempt is made to measure the third order structure function, especially around the equator, and thereby to determine the energy flux from large to small scales.